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Can carbon pricing jointly promote climate change mitigation and human development in Peru?

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ABSTRACT

We assess whether carbon pricing in combination with targeted use of the associated revenues could jointly advance Peru's long-term climate change mitigation targets and short-term socio-economic development goals. Based on expert interviews and detailed document analysis, we draw parallels to extractive industries, where revenues that are earmarked for public investment have often been found to be used ineffectively. Based on these experiences, we identify five key areas that could help to establish carbon pricing as a cross-cutting issue in the context of sustainable development: First, emphasizing the co-benefits of carbon pricing. Second, reforming the power sector to increase the use of low-cost renewable sources. Third, assessing the equity aspects of such policies and designing appropriate compensation systems. Fourth, increasing the government's capacity to effectively carry out public investment. Fifth, using results-based payments to establish a shadow price on land-use emissions and build up institutions and trust.

Introduction

Potential conflicts with short-term socio-economic development objectives are among the most important constraints for the introduction of long-term environmental policies, e.g. for the conservation of natural resources and climate change mitigation (Jakob & Steckel, 2014; Staub-Kaminski, Zimmer, Jakob, & Marschinski, 2014). It has been argued that these conflicts could be relaxed by using market-based policies (such as taxes on natural resources and greenhouse gas emissions) in combination with well-targeted use of the associated revenues (Jakob & Edenhofer, 2014). A price signal would provide an incentive to reduce the overuse of natural resources and the atmosphere (Baranzini et al., 2017; Baumol & Oates, 1988). At the same time, a pricing instrument (such as a tax or an auctioned permit scheme) would generate revenues for the public budget, which could advance socio-economic development, for instance by investing in health, education, and basic infrastructure. Revenues from natural resource rents and carbon pricing, respectively, could provide a substantial share of the funds required to close existing access gaps for basic infrastructure services, such as water, sanitation, or electricity (Fuss et al., 2016; Jakob et al., 2016). In a similar vein, redistributing domestic natural resource rents on an equal per-capita basis within countries could slash global poverty in half (Segal, 2010).

During the last years Peru has put into place an array of energy- and climate-related policies, including a national climate change strategy and emission reduction targets relative to a baseline in its Nationally Determined Contribution (NDC). However, none of these policies explicitly considers carbon pricing as a mitigation measure. For this reason, this paper uses Peru as a case study to examine to what extent carbon pricing, in combination with appropriate recycling of the associated revenues, might constitute a viable policy that jointly promotes climate change mitigation and human development targets.

Peru is an interesting case to analyze the possibilities as well as limitations of this approach, as revenues from extractive industries (mining, as well as gas and oil extraction) are already being channeled via the so-called 'canons' to public investment with the aim to benefit local communities. Focusing on institutional and political barriers for effective revenue recycling via these canons, we distill lessons for the design of a carbon pricing scheme in Peru. Understanding the political dynamics of carbon pricing in a developing country context can yield important insights to inform policy design in other countries. In addition, Latin America is often regarded as an example for other countries that aim at transitioning towards middle income status, for instance in Asia. Hence, successful steps towards low-carbon development in Latin America could strengthen the resolve in other regions to strengthen their climate policies (Edwards & Timmons Roberts, 2015).

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Literature review

This study analyzes how carbon pricing, in combination with targeted use of the associated revenues, could contribute towards reconciling environmental and socio-economic objectives from an integrated sustainable development perspective. In this regard, it is closely related to the literature on multi-dimensional conceptions of human development (Alkire, 2002) as well as multi-objective climate policy (Gough, 2015; Jakob & Steckel, 2016; Stechow et al., 2016). The idea of promoting sustainable development by using market-based instruments to internalize environmental externalities and investing the associated public revenues into issues that are central to human well-being, such as health, education, and basic infrastructure is exposed in Jakob and Edenhofer (2014).

The most important challenges, advantages and implementation issues of carbon pricing have been extensively discussed in the literature and are summarized in e.g. Edenhofer et al. (2015) and Baranzini et al. (2017). However, these insights have not yet been systematically applied to analyze Peru's climate change mitigation policies. Instead, most of the academic literature on climate change in Peru focuses on climate impacts and adaptation, in particular on problems related to melting glaciers and decreased water supply (Fraser, 2012).

To assess the feasibility of using carbon pricing revenues to promote human development, this paper examines recent experiences with revenues from natural resource extraction. Several studies have examined the impacts of mining activities on human development and social conflicts resulting from the adverse impacts of extractive industries. Aragón and Rud (2013) show that the Yanacocha gold mine has raised the average living standards of the local population in Cajamarca, where the mine is located, as well as adjacent districts. However, Ticci and Escobal (2015) argue that mining has not produced linkages to other economic activities and emphasize the heterogeneity of development outcomes across urban and rural areas as well as areas with a long history of mining and new mining areas. Loayza and Rigolini (2016) demonstrate that districts in which mining operation takes place indeed display higher levels of consumption and lower poverty rates, but also more pronounced economic inequality. They also find that the canon minero, which distributes mining revenues across districts and regions (see the Natural resource rents section), has no discernible influence on socio-economic development. Arellano-Yanguas (2011) attributes this outcome to the fact that efforts in the early 2000s to achieve more decentralization and assign greater responsibilities for the management of resource rents to sub-national governments have done little to ensure that revenues from extractive industries result in poverty reduction.

Mining has frequently been found to entail adverse effects that have sparked socio-environmental conflicts. Preciado Jeronimo, Ruth, and Vos (2015) analyze how in Cajamarca gold mining reduces water availability for agricultural purposes, arguing that this competition has resulted in social conflict. Bebbington and Bury (2009) highlight institutional shortcomings regarding transparency and the equitable use of mining revenues, Hinojosa (2011) discusses the failure of the Peruvian government to design and implement policies to translate mining revenues into socio-economic development, and Jaskoski (2014) emphasizes the lack of stakeholder participation as an important driver of social conflict. A comprehensive first-hand account of citizens' concerns is compiled in a study commissioned by the mining company Yanacocha, which aims to identify best practices to improve community engagement (Kemp, Owen, Arbelaez-Ruiz, & Rueda, 2013). The collected interviews suggest that people often suffer the effects of mining without receiving real, tangible benefits in return. According to Kemp, Owen, Gotzmann, and Bond (2011) and Triscritti (2013), even though mining companies are increasingly trying to gain legitimacy for their operations by providing e.g. basic infrastructure, health and education for the local population, these efforts are often regarded as being insufficient and not well targeted to people's needs. Very similar concerns have been brought forward regarding the adverse effects of oil and gas projects, related to the violation of indigenous rights and livelihoods as well as lacking stakeholder involvement (Finer, Jenkins, Pimm, Keane, & Ross, 2008; South Peru Panel, 2015).

In sum, the above evidence suggests that even though extractive industries have raised average incomes, they have at the same time undermined other development objectives and thus resulted in pronounced opposition by local populations.

Theoretical framework and research design

Our theoretical framework assesses how a balance between short-term exigencies of socio-economic development and long-term considerations to safeguard environmental integrity can be achieved (Gough, 2015; Jakob & Edenhofer, 2014). It builds on the following three stages, which are depicted in Fig. 1.

First, policy objectives, to be understood as relevant dimensions of human well-being and social welfare (e.g. consumption possibilities and their distribution, or capabilities to realize people's respective goals in life), need to be identified, and the trade-offs between them need to be assessed. These requirements can be operationalized by defining minimum thresholds for environmental quality and human development. Agreeing on these thresholds is an inherently political process that requires social deliberation (Edenhofer & Kowarsch, 2015). Hence, science can provide information as a basis for this kind of deliberation, but cannot determine the precise characteristics of these minimum thresholds as well as the evaluation of the trade-offs between different social objectives. Nevertheless, it seems reasonable to assume that some human needs, such as access to health, education and basic infrastructure are of a universal character and that consequently only public policies that ensure that none of these thresholds is violated can be considered to be sustainable.

Second, from this set of sustainable public policies, fiscal policies (taxes or auctioned tradable permits for natural resources and environmental externalities) can be employed. These policy instruments ensure that limits on natural resource use and environmental degradation are respected in an economically efficient manner and at the same time convert the scarcity rents associated to limited resource use into revenues for the public budget.

Third, these revenues can be invested in ways that promote human development, for instance by fostering health, education, social security, or access to water, sanitation and electricity. Even though from a theoretical perspective the optimal amount of investment in these areas could be determined by means of cost-benefit analysis, this approach is fraught with substantial problems, in particular with regard to determining citizens' true willingness-to-pay (Hausman, 2012). Hence, we argue that ensuring that minimum thresholds are respected is more feasible in practice, as this approach imposes significantly lower informational requirements on policy makers.

Our discussion is based on 13 interviews (described in the Supplementary Information) carried out in Lima in May and June 2016 as well as detailed document analysis. The interviewed experts covered a broad range of expertise, including representatives of key ministries, civil society, academia, development cooperation and the private sector. As some statements reported in this paper were quite critical of the government, we decided to present them without providing further information regarding the respective interviewee's affiliation or background in order to ensure confidentiality.

Two research questions were central for these interviews: First, which major issues arise concerning the three steps outlined above, namely definition of thresholds, appropriation of rents and investment of revenues for the case of extractive industries? Second, which insights can be derived with regard to carbon pricing in combination with revenue recycling to promote human development?

Due to the broad variety of interviewees' backgrounds, we deliberately refrained from using a standardized questionnaire and decided to resort to semi-structured interviews instead. Hence, individual interviews are not directly comparable and hence not suitable for quantitative